U.S.S.N. 09/544,045

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AMENDMENT AND RESPONSE TO OFFICE ACTION

contacting a variant recombinase identified by the method of claim 1 with [first and second] third and fourth DNA sequences,

wherein the [first] <u>third</u> DNA sequence comprises a [first] <u>fifth</u> recombination site and the [second] <u>fourth</u> DNA sequence comprises a [second] <u>sixth</u> recombination site,

wherein the variant recombinase mediates recombination between the [first and second] fifth and sixth recombination sites thereby producing the site specific recombination.

- 25. (Amended) The method of claim 24 wherein the [first] <u>fifth</u> recombination site, the [second] <u>sixth</u> recombination site, or both, are variant recombination sites.
- 26. (Amended) The method of claim 24, wherein the [first and second] third and fourth DNA sequences are connected by a pre-selected DNA segment.
- 27. (Amended) The method of claim 26, wherein the [first and second] fifth and sixth recombination sites have the same orientation and the site-specific recombination of DNA is a deletion of the pre-selected DNA segment.
- 29. (Amended) The method of claim 27 further comprising contacting the variant recombinase with a [fourth] <u>fifth</u> DNA sequence comprising a [third] <u>seventh</u> recombination site, wherein the [second and fourth] <u>fourth and fifth</u> DNA sequences are connected by a second preselected DNA segment.
- 30. (Amended) The method of claim 29 wherein the [first] <u>fifth</u> recombination site is a variant recombination site recognized by the variant recombinase and not by wild type recombinase, and wherein the [second and third] <u>sixth and seventh</u> recombination sites are recombination sites recognized by wild type recombinase and by the variant recombinase.

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- 31. (Amended) The method of claim 30 further comprising, prior to contacting the variant recombinase with the [first, second, and third] <u>fifth, sixth, and seventh</u> recombination sites, contacting the recombination sites with wild type recombinase, thereby producing site specific recombination between the [second and third] <u>sixth and seventh</u> recombination sites resulting in a deletion of the second pre-selected DNA segment.
- 33. (Amended) The method of claim 26, wherein the [first and second] <u>fifth and sixth</u> recombination sites have opposite orientations and the site-specific recombination is an inversion of the nucleotide sequence of the pre-selected DNA segment.
- 34. (Amended) The method of claim 33, wherein the [first and second] <u>fifth and sixth</u> recombination sites are variant recombination sites recognized by the variant recombinase.
- 36. (Amended) The method of claim 24, wherein the [second and third] <u>fourth and</u> <u>fifth</u> DNA sequences are introduced into two different DNA molecules and the site-specific recombination is a reciprocal exchange of DNA segments proximate to the recombination sites.
- 37. (Amended) The method of claim 36, wherein the [first and second] <u>fifth and sixth</u> recombination sites are variant recombination sites recognized by the variant recombinase.
- 38. (Amended) The method of claim 24 wherein the [second] <u>fourth</u> DNA sequence includes a label, wherein recombination between the [first and second] <u>fifth and sixth</u> recombination sites associates the label with the [first] <u>third</u> DNA sequence.
- 39. (Amended) The method of claim 38 wherein the [first] third DNA sequence is a large circular DNA molecule.

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- 41. (Amended) The method of claim 40 wherein the variant recombinase is contacted with the [first and second] third and fourth DNA sequences by introducing into the cell [a third] a sixth DNA sequence comprising DNA encoding the variant recombinase.
- 42. (Amended) The method of claim 41, wherein the [third] <u>sixth</u> DNA sequence further comprises a regulatory nucleotide sequence and expression of the variant recombinase is produced by activating the regulatory nucleotide sequence.
- 45. (Amended) The method of claim 40, wherein the [first and second] third and fourth DNA sequences are connected by a pre-selected DNA segment, wherein the first and second recombination sites have the same orientation and the site-specific recombination of DNA is a deletion of the pre-selected DNA segment.

Remarks

Claims 1-49 are pending. Claims 3, 24, 25-27, 29-31, 33, 34, 36-39, 41, 42, and 45 have been amended. Claim 3 has been amended to clarify that it is the recombination frequency that is significantly reduced. Support for the amendments made to claim 3 can be found, for example, at lines 28-13, bridging pages 93 and 94. Claim 24 and the claims dependent thereon have been amended to provide clarity to the claimed composition. Claim 24 has been amended to refer to a set of recombination sites using different denotations (i.e. fifth site, sixth site). These sites are recognized and recombined by the variant recombinase *identified* in claim 1. The sites may or may not comprise identical sequences used to identify the variant recombinase in claim 1 (i.e. the first, second, third and fourth sites). All claims dependent from the newly amended claim 24